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November 10, 1992

VIA HAND DELIVERY

92-100

Donna Searcy
Secretary
Federal Communications Commission
1919 M Street, N.W.
Washington, D.C. 20554

Dear Ms. Searcy:

Andrew Corporation, by its undersigned attorneys, hereby attach for filing a corrected page "13" of Andrew Corporation's comments in Docket 90-314, reflecting the correct telephone number for Swidler & Berlin -- (202) 944-4300. To avoid confusion, Andrew includes a 4complete copy of its comments in this filing.

Please substitute these corrected versions of Andrew's comments for those timely filed on November 9, 1992.

Sincerely,

Margaret M. Charles
Counsel for
Andrew Corporation

Attachments

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Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	
Amendment of the Commission's Rules to Establish New Personal Communications Services	GEN Docket 90-314 ET Docket 92-100

COMMENTS OF ANDREW CORPORATION

James Gunn
Director of Distributed Data Systems

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Dated: November 9, 1992

TABLE OF CONTENTS

SUMMARY

Andrew Corporation generally supports the Commission's proposal to allocate spectrum to unlicensed personal communications services ("PCS"). However, Andrew believes that the 20 MHz of spectrum proposed by the Commission is inadequate to house in-building high speed wireless LANs. Andrew urges the Commission to increase the allocation for unlicensed PCS by 20 MHz for a total of 40 MHz, and adopt rules that will permit third parties to operate in-building PCS systems on licensed PCS frequencies. Alternatively, if the Commission finds it necessary, it should issue a further Notice in this proceeding or initiate a separate proceeding, on an expedited basis, to address the numerous technical, interference, and interconnection issues not addressed in this Notice.

In Andrew's view, there is a critical distinction between the frequency allocation and regulatory needs personal communications networks or what Andrew refers to as Global-PCS, and the frequency allocation and regulatory needs of the in-building PCS market. Yet, the Commission's Notice provides only a brief discussion of unlicensed PCS without any recognition of, or any proposals to address, the myriad technical, regulatory, and licensing issues specific to the in-building PCS market. Perhaps even more critical to the successful development of the in-building PCS market, is the Commissions understanding of the distinct frequency allocation and regulatory needs of the different sectors within the in-building market, namely the wireless telephony/low speed data and the high speed wireless LAN submarkets.

Given the Commission's stated desire to promote the development of a wide range of PCS services and the existing demand for in-building PCS systems, Andrew strongly urges the Commission to modify its proposal to implement unlicensed PCS to address the particular spectrum and regulatory needs of the in-building submarkets. As discussed below, Andrew urges the Commission to 1) expand the spectrum block earmarked for unlicensed PCS by 20 MHz to

accommodate the development of wireless high speed data LANs, 2) provide interference-free unlicensed spectrum for wireless telephony and low speed data services, and 3) adopt a regulatory scheme that will permit third parties access to licensed Global-PCS frequencies to provide in-building voice and low speed data services.

Before the
FEDERAL COMMUNICATIONS COMMISSION
Washington, D.C. 20554

In the Matter of	)	
	)	
Amendment of the Commission's Rules to Establish New Personal Communications Services	)	GEN Docket 90-314 ET Docket 92-100

COMMENTS OF
ANDREW CORPORATION

Andrew Corporation ("Andrew") hereby submits these comments in response to the Commission's Notice of Proposed Rulemaking ("Notice") regarding personal communications services ("PCS").[1/] Andrew supports generally the Commission's proposal to establish a comprehensive regulatory framework for the family of PCS services and the allocation of spectrum for unlicensed PCS systems.[2/] Nevertheless, Andrew is disheartened by the Commission's failure to allocate sufficient spectrum (40 MHz) to house in-building wireless communications systems including high speed wireless LANs and to address the myriad technical, regulatory and licensing issues raised by in-building PCS systems.

[1/] Amendment of the Commission's Rules to Establish New Personal Communications Services, GEN Docket 90-314, ET Docket 92-100 (released August 14, 1992).

[2/] Personal Communications Services are defined as that a family of mobile or portable radio communications services could provide services to individuals and businesses and be integrated with a variety of competing networks.

I. INTRODUCTION

Despite the Commission's attempt to "[gather] information on PCS and educat[e] itself on [PCS] communications developments,"[3/] the Commission's Notice overlooks a number of fundamental realities about the nature of the PCS market. Namely, the Commission fails to recognize the distinction between personal communications networks or what might be referred to as Global-PCS[4/] and in-building PCS[5/], and the differing frequency allocation and regulatory needs of each market. Perhaps even more critical to the development of the in-building PCS market, the Commission fails to recognize that two distinct and separate markets with differing needs comprise the in-building PCS market. The in-building market is comprised of the 1) wireless telephony/ low speed data services[6/] and 2) the high speed wireless LAN market and combinations thereof.[7/] Wireless telephony allows users to communicate with each other via wireless PBXs and telephone handsets operating on radio frequency. High speed wireless LANs allow users to communicate quickly and inexpensively with computers attached to the network and to share information and resources as well as use their computers to form, dissolve and reform working groups. Each segment of the in-building PCS market requires frequency allocations and/or creative regulatory approaches to meet the extensive demands of the business sector for in-building PCS.

[3/] Notice, supra at ¶ 4.

[4/] For the purpose of these comments, Andrew uses the term Global-PCS to refer to the various proposed personal communications networks that would operate primarily in wide geographic areas outside of buildings.

[5/] In-building PCS refers to in-building telephony and high speed wireless data LANs servicing a limited enclosed area.

[6/] In-building telephony refers to wireless PBX, LANs and other closed environment wireless voice and low speed data systems.

[7/] In-building wireless data LANs refers to high speed data-PCS.

Further, as discussed below, Andrew believes that in-building PCS services must be provided on an unlicensed basis. Consistent with the Notice and other industry comments in this proceeding, Andrew uses the term "unlicensed" in the PCS context to denote the ability of service providers and customers to use PCS services without obtaining construction or operating authority from to Commission. In this respect, unlicensed PCS use is similar to existing Part 15 operations which are required only to obtain equipment authorization under Part 2 of the Commission's Rules. However, for purposes of these comments and unlike existing operations under Part 15, Andrew evisions "unlicensed" PCS to include frequency coordination procedures to guarantee interference free operation to new in-building PCS users and existing users.

II. BACKGROUND OF ANDREW CORPORATION

Andrew is a global supplier of electronic communication products and services, serving cellular, LAN mobile, common carrier, private microwave, and broadcast markets. Andrew has a strong interest in providing various equipment, systems and services for in-building PCS systems. Andrew will focus these comments on the regulatory and frequency allocation needs of the in-building PCS market needs of the two segments of the in-building PCS market.

III. IN-BUILDING WIRELESS SYSTEMS ARE PART OF THE PCS FAMILY THAT THE COMMISSION MUST ACCOMMODATE

In the years since the Commission first authorized cellular service, the mobile and portable technologies have revolutionized the American way of life, increasing the mobility and accessibility of people in and outside the home. Consumers have access to cordless telephones in the home and paging and cellular services in and outside the home. The Commission has consistently adopted rules and policies to promote investment in the development of wireless technologies for the home (cordless telephones) and public areas (cellular telephone service).

Indeed, this Notice's primary focus on the Global-PCS market underscores the Commission's attempt to address growing consumer demand for advanced wireless technologies. The in-building business market is the only segment of our society which is currently devoid of access to any high quality wireless systems that allow full mobility within the building. Yet, studies have shown that the largest volume of telephone and data traffic is generated in the private business environment. A recent survey of 300 businesses conducted by a Scottsdale, Arizona firm concluded that 30% of the businesses will have wireless telephone systems by 1997.[8/] Another study estimates wireless penetration of offices with over 400 lines at over 26%.[9/] Unless specific regulatory steps are taken to foster the development of wireless in-building systems, American businesses striving to maintain leadership in world competitiveness will be left behind as businesses abroad capitalize on the advantages -- increased mobility, efficiency and productivity -- of wireless telephony and data LAN systems. As evidenced by the numerous comments in support of in-building wireless telephony and high speed wireless data LANs filed in response to the Commission's Notice of Inquiry ("NOI") in this Docket, there is strong extensive demand for high quality, interference free, in-building wireless services.[10/]

[8/] Opportunities in the U.S. Wireless In-Building Business Communications Market, Alexander Resources, Scottsdale, AZ, December, 1990.

[9/] U.S. Office Telephony Systems 1991, Economic and Management Consultants, Inc., June, 1991 at 14.

[10/] In the PCS NOI the following parties expressed support for the concept of a wireless PBX: AT&T (Reply at 12); NCR Corporation (Comments at 2-3); Fleetcall, Inc. (Comments at 4-7); Apple Computer, Inc. (Comments at 2-4); LACE, Inc. (Comments at 1); MCI Corporation (Comments at 8); GEC Plessey Telecom Ltd. (Comments at 11, Reply at 8); Uniden America Corp. (Comments at 2); Motorola, Inc. (Comments at 5, Reply at 14-15); Telephone & Data Systems, Inc. (Reply at 14); Matrix Personal Communications, Inc. (Reply at 5); San Francisco Consulting Group (Reply at 4); Rock Hill/Fort Mill/Lancaster Telephone Companies (Reply at 6); LiTel Telecommunications, Inc. (Reply at 9); GTE Service Corp. (Comments at 8); Millicom (Comments at 10); Firstmark Communications (Comments at 3); British Aerospace (Reply at 3); Digital Spread Spectrum Technologies (Comments at 3); EasyPhone (Comments at 2); Ferranti Creditphone (Comments at 2); Advanced Cordless Technologies (Comments at 2); NovAtel (Comments, Appendix CT-3, page 1); Rochester Telephone Company (Comments at 8); Centel (Comments at 19); Northern Telecom Inc. (Comments at 8); BellSouth (Comments at 5); Southwestern Bell Corp. (Comments at 2) and Pacific Telesis (Comments at 11-12).

After extensive market and technical analysis, industry participants attempting to meet the demand for in-building high speed wireless data LANs and telephony services have concluded that there is currently neither sufficient available clear spectrum nor available technology to meet the extensive demand for interference free wireless service for businesses. Low power, unlicensed operation under Part 15 cannot provide the necessary protection against interference. As a technical matter, for example, in-building systems operating on the 902-928 "consumer bands" (including those using spread spectrum technology) are subject to interference from a variety of industrial, scientific and medical ("ISM") devices authorized to operate in the band, automobile vehicle monitoring, amateur radio, and government systems. As a practical matter, even if very little actual interference occurs to such low power Part 15 systems, consumers -- and consequently manufacturers -- will not invest in the substantial expense of developing, manufacturing, and installing in-building wireless data LAN systems or wireless telephony systems that are, by FCC rule, secondary to a multitude of other services.

Consumer demand for in-building wireless services cannot be met by cellular systems which are cumbersome and too expensive. They offer low data rates at high costs per unit of air time, in addition to the costs and delay associated with the licensing process.[11/] The only option available to the Commission to stimulate the necessary investment to develop interference free, in-building wireless services is to allocate sufficient spectrum to house these services.

Technically, Andrew concurs with the Commission that the 2 GHz band is the appropriate band to house both in-building wireless telephony and high speed data LANs. The 2 GHz band possesses the optimum propagation characteristics for local area in-building use,

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[11/] Andrew fervently believes that wireless in-building systems must be provided on an unlicensed basis in order to be economic. As discussed in detail in section VI, Andrew believes that the Commission should adopt frequency coordination rules and other policies that would permit unlicensed third parties to coexist with Global-PCS providers on the same frequencies.

allows sufficient penetration between walls and partitions within buildings, and will facilitate frequency reuse.

IV. SPECTRUM ALLOCATED FOR UNLICENSED PCS IN THE COMMISSION'S NOTICE IS INADEQUATE TO HOUSE IN-BUILDING HIGH CAPACITY WIRELESS LANS

The Commission proposes to amend Part 15 of its rules to authorize unlicensed use of 20 MHz in the 1910-1930 MHz band for "families of PCS services that will be useful for the transmission of high and low speed data between computing devices, cordless telephones and wireless PBXs."[12/] The unlicensed devices would operate on a co-primary basis with existing microwave stations.[13/] Further, the Commission proposes to channelize the band into a 10 MHz block for broadband technologies, a 5 MHz block divided into four 1.25 MHz channels, and a 5 MHz block divided into fifty 100 KHz channels. As an alternative, the Commission seeks comment on the potential overlay of several blocks of spectrum: two 10 MHz blocks, overlaid by sixteen 1.25 MHz blocks, in turn overlaid with two hundred 100 KHz blocks.

Andrew strongly supports the Commission's decision to carve out a block of spectrum for unlicensed PCS use. Dedicated spectrum for unlicensed PCS use is a critical first step in promoting development of wireless technologies for a panoply of unlicensed in-building services to meet market demand. While 20 MHz may be enough to facilitate the introduction of in-building telephony and low speed data wireless systems, it is inadequate to support high capacity, high speed wireless data LANs. "Clear" spectrum is required for unlicensed PCS use so that multiple service providers may establish interference-free wireless systems in a closed office environment with more favorable air-time charges and/or user licensing procedures.

[12/] Notice, supra at ¶ 41.

[13/] Existing microwave stations are defined to include stations for which license applications are on file as of July 16, 1992.

Unfortunately, the Commission's 20 MHz frequency allocation proposal does not go far enough to permit the proliferation of unlicensed in-building PCS systems. The frequency allocation proposal for unlicensed operations in the Notice is not sufficient to remedy the existing dearth of available, interference-free spectrum to house in-building wireless systems. Indeed, the Commission's brief discussion of unlicensed PCS services in the Notice does not account for the bifurcated nature of the in-building PCS market and the different spectrum and other needs of in-building telephony/low data rate wireless systems and high capacity wireless LANs. Without additional allocations of spectrum, it would be impossible to provide the quality wireless communications that consumers desire. The Commission's mere allocation of spectrum without any discussion of other issues critical to in-building PCS, such as interconnection of Global-PCS and in-building PCS, intersystem roaming, technical interference, frequency coordination between Global PCS and in-building PCS systems, and other strategies to permit unlicensed third party access to PCS frequencies, does not go far enough to advance expeditious introduction of any form of wireless in-building systems.

Given the existing demand for in-building PCS systems, Andrew strongly urges the Commission to revisit its proposal to implement unlicensed PCS with particular focus on the differing spectrum and regulatory needs of in-building wireless telephony and high speed data wireless LANs. As discussed below, Andrew urges the Commission to 1) expand the spectrum block earmarked for unlicensed PCS by 20 MHz to accommodate the development of wireless high speed data LANs, 2) provide unlicensed spectrum for wireless telephony and low speed data services, and 3) adopt a regulatory scheme that will permit third parties access to licensed PCS frequencies to provide in-building voice and low speed data services.

V. THE COMMISSION MUST ALLOCATE SUFFICIENT SPECTRUM TO PROVIDE RELIABLE IN-BUILDING, HIGH CAPACITY WIRELESS LAN SERVICES

It is axiomatic that private business needs for mobile, wireless communications systems comprise a large segment of the PCS market that the Commission cannot afford to neglect. And yet, despite the Commission's recognition of the growing need for wireless technologies[14/] to serve the business sector, and the urging of the business community to allocate spectrum immediately for in-building systems,[15/] the Commission's Notice fails to address fully the spectrum needs of this segment of the in-building market. While the proposed 20 MHz of frequency may be adequate for in-building wireless telephony systems, it does not change the status quo with regard to the lack of suitable spectrum to meet the anticipated extensive demand for interference-free, reliable in-building wireless high-speed data LANs.

Indeed, this parsimonious spectrum allocation retards the development of in-building wireless LAN technologies. Under the approach proposed in the Notice, LANs must be designed and marketed for unlicensed operation in either the very limited 20 MHz of "clear" spectrum or in spectrum highly susceptible to interference from other services (on a low power Part 15 basis). Neither of these options is acceptable from a technical or a marketing perspective. Such an allocation discourages technology innovators and equipment manufacturers from devoting financial and other resources to the development of in-building wireless LANs.

Andrew concurs with the view of numerous proponents of in-building wireless LANs that a minimum of 40 MHz of spectrum is required to fulfill the needs of closed environment, high

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[14/] Notice of Inquiry, 5 FCC Rcd. 3995, 3996 (1990).

[15/] See Comments of Rolm Systems Relating to the Personal Communications Services En Banc Proceeding at 13: Comments of the Ericsson Corporation in Response to Presentations Made at the FCC's En Banc Hearing at 6; Testimony of McCaw Cellular Communications, Inc. at the En Banc Hearing on Personal Communications Services at 14; Amendment of Section 2.106 of the Commission's Rules to Establish High Speed Data Communications Apple Computer Petition for Rulemaking Among Personal Computing Devices, Petition for Rulemaking, RM-7618 at 17 ("Apple Petition").

speed data users. Both Rolm Systems and Apple Computer, Inc. have stated that 40 MHz is the minimum amount of bandwidth necessary to adequately meet the present and foreseeable needs of data PCS.[16/] Apple argues that 40 MHz is necessary to permit several data-PCS networks operating at rates of up to 10 Mbps to coexist in the same geographic area as well as to motivate technological innovations that can lead to higher data rates in the future.[17/] Ericsson Corporation has similarly requested 50 MHz of spectrum for business PCS services arguing that it will provide the business community with 100% wireless penetration for the in-building market.

Most industry participants have struggled with spectrum sharing in attempting to develop in-building wireless high-speed data LANs. Even with the use of spread spectrum technologies, an allocation of less than 40 MHz for in-building wireless LANs is untenable,[18/] and will further delay the introduction of in-building wireless technology to the business sector. Accordingly, Andrew urges the Commission to revisit its designation of only 20 MHz for unlicensed PCS users and designate an additional 20 MHz to unlicensed PCS services. This additional 20 MHz will permit providers to meet growing demand for high speed, high capacity wireless LANs and integrated communications systems.

[16/] Rolm for example, has stated that "it is believed the application will require 40 MHz to accommodate the variety of manufacturers and high capacity specifications. Rolm bases its conclusion on a capacity analysis performed by Hatfield and Associates on behalf of FMR Corp. Rolm Systems Comments on En Banc hearing on PCS; Apple Petition, supra at 20.

[17/] Apple Petition, supra at 21.

[18/] There appears to be substantial industry support for the allocation of 40 MHz of spectrum for in-building wireless LANs as reflected by the WIN Forum's position in the on-going debate. Alternatively, Andrew would urge the Commission to reallocate the 2.4-2.5 GHz ISM bands for non-licensed wireless LANS. Further, if the ISM bands are reallocated for unlicensed wireless LAN use, frequency coordination and other procedures would be required to assure interference free operation in the band.

VI. THE COMMISSION SHOULD ADOPT RULES TO PERMIT UNLICENSED THIRD PARTIES TO USE LICENSED PCS FREQUENCIES TO PROVIDE WIRELESS IN-BUILDING TELEPHONY AND LOW SPEED DATA SERVICES

The Commission should also adopt rules that will allow the proliferation of wireless in-building telephony and low speed data systems in an environment where the Commission has licensed one or more Global-PCS service providers. The Commission proposes in the Notice to issue one or more PCS licenses for geographic service areas ranging from the 487 Basic Trading Areas to a single nationwide license. The Commission will select among the service area options by balancing the benefits of greater participation by multiple providers against the potential economies of scale and scope. Implicit in the Commission's proposed options is the recognition that PCS providers licensed under the rules will provide PCN-type wireless voice services within a relatively large area.

As currently envisioned then, Global-PCS will be introduced under the rules adopted in this proceeding principally as a flexible outside/inside system serving users between home, public areas and office. As discussed earlier, Global-PCS must be distinguished from the closed-environment, in-building stand-alone systems designed to meet specific business customer demand for wireless voice services and low speed data transmission.

As discussed earlier, Andrew believes that Global-PCS networks and in-building PCS systems serve as separate and distinct markets. These distinct systems serve different consumer needs and call for different market and technical expertise. In-building wireless services are not suited to a pricing structure that includes non-competitive service fees and air-time charges. As a result, it is possible that traditional carriers or licensed service providers, such as Global-PCS providers, may not be inclined to target in-building services as a priority market. In that case, it may take longer to develop fully the in-building wireless market in the near future.

Consequently, unless the Commission adopts specific rules to accommodate in-building systems, the Commission's initiative to introduce PCS in the United States rapidly will bypass

the important wireless in-building telephony and low speed data market. Further, to the extent that 2 GHz frequencies are devoted exclusively to licensed PCS providers who do not develop in-building voice and high speed data systems, the Commission's PCS licensing scheme will effectively stifle the future development of this segment of the wireless market. Accordingly, it is critical that the Commission adopt specific rules to permit third parties unlicensed access to licensed PCS spectrum so that they may establish wireless in-building telephony and low speed wireless data systems.

Specifically, Andrew proposes that third party service providers who wish to serve the wireless in-building market should be able to use the licensed 2 GHz spectrum to establish wireless PBX telecommunications systems or wireless low speed data systems. Several feasible options exist by which the Commission could authorize in-building telephony and low power wireless data services (other than allocating additional spectrum specifically for this use) in addition to Global-PCS services. The Commission could require, for example, PCS licensees to carve out "in-building franchise" territories within which third parties would be permitted to establish in-building systems for operation on a primary basis.[19/] Ideally, neither the in-building provider nor end users would be required to be licensed, thus allowing for maximum flexibility and minimum delay and expense in establishing such systems.

Global-PCS and in-building providers could be required to undertake frequency coordination procedures, much like other radio services, to avoid intersystem interference. As discussed above, market demand requires that in-building service providers have interference protection for its systems. Conversely, third-party in-building systems should be required to operate on a noninterference basis vis-a-vis the licensed PCS provider in the area. Suitable coordination and technical guidelines would need to be established by the Commission in this or

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[19/] Andrew believes that a requirement that the PCS provider resell its services will not adequately address the needs of third party providers or end users. A traditional resale arrangement would likely involve noncompetitive in-building airtime charges by Global-PCS providers and would not provide the flexibility critical to in-building voice and data systems.

another rulemaking proceeding. Coordination could be performed by the parties or by a separate coordinating body as is done in the private land mobile service.

Andrew recognizes that allowing in-building systems to operate on licensed frequencies within the service territory of a licensed PCS provider presents technical, interference, licensing, interconnection, and service issues that have not been raised in the Commission's Notice. In that regard, the FCC has not considered a mechanism to ensure intersystem compatibility and seamless communications between in-building and Global-PCS systems. For example, the Notice does not contemplate or propose technical rules that would allow intersystem roaming so that an end user could use the same handset (perhaps by detecting or changing to a control channel) to access global PCS and wireless in-building telephony system. Intersystem roaming is critical to the development of a seamless wireless communications network and must be addressed at this early stage in the development of PCS. This issue cannot be revisited after millions of dollars have been devoted to the development and installation of Global-PCS systems. By considering and adopting rules that will allow intersystem roaming and unlicensed third party access to appropriate PCS frequencies, both cellular and Global-PCS frequencies would likely become less congested.

It is precisely because the Notice does not adequately address in-building wireless telephony and wireless high speed data LAN issues that Andrew urges the Commission to address such issues at this time. Andrew also recognizes that these issues may be more appropriately addressed in a Third Notice of Proposed Rulemaking in this docket or in a separate proceeding. To allow the full development of the in-building voice and data market, Andrew requests that the Commission identify additional spectrum for unlicensed high speed data wireless LANs and adopt rules that will permit third parties to operate in-building telephony systems on licensed PCS frequencies. Alternatively, if the Commission finds it necessary, it should issue a further Notice in this proceeding or initiate a separate proceeding,

on an expedited basis, to address the numerous technical, interference, and interconnection issues not addressed in this Notice.

Respectfully submitted

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Dated: November 9, 1992

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